

In re Reissue Application of: Zatezalo et al.
Serial No.: 10/757,348
Filing Date: January 14, 2004
Reissue of U.S. Patent No. 6,339,718
Preliminary Amendments

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application.

Listing of Claims:

Claim 1 (Currently Amended). A fluid injection apparatus comprising:

~~at least one~~ a first drive mechanism and a second drive mechanism;

~~at least two~~ a first fluid containers container operably associated with the ~~at least one first~~ drive mechanisms, ~~one the first~~ fluid container containing a ~~contrast medium and the other fluid~~ container containing a ~~flushing medium~~ first medium; and

a second fluid container operably associated with the second drive mechanism, the second fluid container containing a second medium; and

a control device operably associated with the ~~at least one~~ first and second drive mechanism, the control device operable to selectively program a plurality of phases of an injection procedure, each of the ~~plurality of phases~~ capable of comprising at least one of a contrast medium phase, a flushing medium phase and a KVO phase.

2 (Original). The apparatus of claim 1 wherein at least one of the two fluid containers comprises a syringe.

3 (Original). The apparatus of claim 1 wherein the first phase comprises a flushing medium phase and the second phase comprises a contrast medium phase.

4 (Original). The apparatus of claim 1 wherein the phases are defined by at least two injection parameters selected from fluid flow rate, fluid volume and injection duration.

5 (Currently Amended). A fluid injection apparatus comprising:

~~at least one~~ a first drive mechanism and a second drive mechanism;

a first fluid containers container operably associated with the ~~at least one first~~ drive mechanism, ~~one the first~~ fluid container containing a ~~contrast~~ first medium ~~and the other fluid~~ container containing a ~~flushing medium~~; and;

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a second fluid container operably associated with the second drive mechanism, the second fluid container containing a second medium; and

a control device operably associated with the ~~at least one~~ first and second drive mechanisms, the control device operable to selectively program at least two phases of an injection procedure, the first phase comprising one of at least a contrast medium phase and a flushing medium phase and the second phase comprising a hold phase, wherein KVO occurs during the hold phase.

6 (Original). The apparatus of claim 5 wherein the hold phase is of indefinite duration.

7 (Original). The apparatus of claim 5 wherein the hold phase allows an operator to modify one or more injection parameters of a subsequent phase.

8 (Original). The apparatus of claim 5 wherein the at least one fluid container comprises a syringe.

9 (Currently Amended). A fluid injection apparatus comprising:

~~at least one~~ a first drive mechanism and a second drive mechanism;

~~at least two~~ a first fluid containers container operably associated with the ~~at least one~~ first drive mechanism, ~~one~~ the first fluid container containing a ~~contrast~~ first medium ~~and the other fluid container containing a flushing medium; and;~~

a second fluid container operably associated with the second drive mechanism, the second fluid container containing a second medium; and

a control device operably associated with the ~~at least one~~ first and second drive mechanisms, said control device comprising:

means for programming a first phase of an injection procedure;

means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure; and

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means for programming a third phase of an injection procedure, subsequent to a second phase of an injection procedure, as a phase other than a flushing medium phase.

10 (Original). The apparatus of claim 9, wherein said means for programming a first phase of an injection procedure comprises means for programming a first phase of an injection procedure as a phase other than a contrast medium phase.

11 (Original). The apparatus of claim 10, wherein said means for programming a first phase of an injection procedure comprises means for programming a first phase of an injection procedure as a contrast medium phase.

12 (Original). The apparatus of claim 9, wherein said means for programming a second phase of an injection procedure comprises:

means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a contrast medium phase; and

means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a flushing medium phase.

13 (Original). The apparatus of claim 9, wherein said control device further comprises means for programming a third phase of an injection procedure as a flushing medium phase.

14 (Original). The apparatus of claim 9, wherein said means for programming a second phase of an injection procedure comprises means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a hold phase.

15 (Original). The apparatus of claim 9, wherein said control device further comprises means for programming a pause phase to occur between first and second phases of an injection procedure.

16 (Currently Amended). A fluid injection apparatus comprising:

~~at least one~~ a first drive mechanism and a second drive mechanism;

~~at least two~~ a first fluid container operably associated with the ~~at least one~~ first drive mechanism, ~~one~~ the first fluid container containing a ~~contrast~~ first medium ~~and the other~~ fluid container containing a flushing medium; and;

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a second fluid container operably associated with the second drive mechanism, the second fluid container containing a second medium; and

a control device operably associated with the ~~at least one~~ first and second drive mechanisms, said control device comprising:

means for programming a first phase of an injection procedure;

means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure;

means for programming a third phase of an injection procedure, subsequent to a second phase of an injection procedure; and

means for programming a fourth phase of an injection procedure, subsequent to a ~~second~~ third phase of an injection procedure, as a phase other than a flushing medium phase.

17 (Original). The apparatus of claim 16, wherein said means for programming a first phase of an injection procedure comprises means for programming a first phase of an injection procedure as a phase other than a contrast medium phase.

18 (Original). The apparatus of claim 17, wherein said means for programming a first phase of an injection procedure comprises means for programming a first phase of an injection procedure as a contrast medium phase.

19 (Currently Amended). The apparatus of claim 16, wherein said means for programming a second phase of an injection procedure comprises:

means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a ~~flushing~~ contrast medium phase; and

means for programming a second phase of an injection procedure, subsequent to a first phase of an injection, as a flushing medium phase.

20 (Original). The apparatus of claim 16, wherein said means for programming a third phase of an injection procedure comprises:

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means for programming a third phase of an injection procedure, subsequent to a second phase of an injection procedure, as a contrast medium phase; and

means for programming a third phase of an injection procedure, subsequent to a second phase of an injection procedure, as a flushing medium phase.

21 (Original). The apparatus of claim 16, wherein said control device further comprises means for programming a fourth phase of an injection procedure, subsequent to a third phase of an injection procedure, as a flushing medium phase.

22 (Original). The apparatus of claim 16, further comprising means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a hold phase.

23 (Original). The apparatus of claim 16, wherein said control device further comprises:

means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure; and

means for programming a pause phase to occur between first and second phases of an injection procedure.

24 (Currently Amended). A fluid injection apparatus comprising:

~~at least one~~ a first drive mechanism and a second drive mechanism;

~~at least two~~ a first fluid container operably associated with the at least one first drive mechanism, one- the first fluid container containing a contrast first medium and the other fluid container containing a flushing medium; and;

a second fluid container operably associated with the second drive mechanism, the second fluid container containing a second medium; and

a control device operably associated with the ~~at least one~~ first and second drive mechanisms, said control device comprising means for programming a first phase of an injection procedure as a phase other than a contrast medium phase.

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25 (Original). The apparatus of claim 24, wherein said control device further comprises means for programming a first phase of an injection procedure as a contrast medium phase.

26 (Original). The apparatus of claim 24 wherein at least one of the two fluid containers comprises a syringe.

27 (Original). The apparatus of claim 24 wherein said means for programming a first phase of an injection procedure as a phase other than a contrast medium phase comprises means for programming a first phase of an injection procedure as a flushing medium phase.

28 (Original). The apparatus of claim 24, wherein said control device further comprises means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a contrast medium phase.

29 (Original). The apparatus of claim 24, wherein said control device further comprises means for defining at least one phase of an injection procedure by at least two injection parameters selected from fluid flow rate, fluid volume and injection duration.

30 (Original). The apparatus of claim 24, wherein said control device further comprises means for defining each phase of an injection procedure by at least two injection parameters selected from fluid flow rate, fluid volume and injection duration.

31 (Original). The apparatus of claim 24 wherein said control device further comprises:

means for programming a first phase of an injection procedure as a KVO phase.

32 (Original). The apparatus of claim 24 wherein said control device further comprises means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a flushing medium phase.

33 (Original). The apparatus of claim 24 wherein said control device further comprises means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a KVO phase.

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34 (Original). The apparatus of claim 24, further comprising means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a hold phase.

35 (Original). The apparatus of claim 34 wherein said means for programming a second phase of an injection procedure as a hold phase comprises means for establishing a hold phase of indefinite duration.

36 (Original). The apparatus of claim 35 wherein said means for programming a second phase of an injection procedure as a hold phase comprises means for establishing KVO during a hold phase.

37 (Original). The apparatus of claim 34, wherein said control device further comprises means for facilitating, during a hold phase, modification of one or more injection parameters of a subsequent phase.

38 (Original). The apparatus of claim 24, wherein said control device further comprises:

means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure; and

means for programming a pause phase to occur between first and second phases of an injection procedure.

39 (Original). The apparatus of claim 38, wherein said means for programming a first phase of an injection procedure as a phase other than a contrast medium phase comprises means for programming a first phase of an injection procedure as a flushing medium phase.

40 (Original). The apparatus of claim 38, wherein said means for programming a second phase of an injection procedure comprises:

means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a contrast medium phase; and

means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a flushing medium phase.

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41 (Original). The apparatus of claim 38 wherein said means for programming a pause phase comprises means for establishing a pause phase for a fixed duration of time.

42 (Original). The apparatus of claim 38 wherein said control device comprises means for automatically commencing a second phase of an injection procedure after the end of a pause phase.

43 (Currently Amended). A fluid injection apparatus comprising:

~~at least one~~ a first drive mechanism and a second drive mechanism;

~~at least one~~ a first fluid container operably associated with the ~~at least one~~ first drive mechanism;

a second fluid container operably associated with the second drive mechanism; and

a control device operably associated with the ~~at least one~~ first and second drive mechanisms, said control device comprising:

means for programming a first phase of an injection procedure as a contrast medium phase or a flushing medium phase;

~~means for programming a first phase of an injection procedure as a flushing medium phase;~~ and

means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a hold phase.

44 (Currently Amended). A fluid injection apparatus comprising:

~~at least one~~ a first drive mechanism and a second drive mechanism;

~~at least one~~ a first fluid container operably associated with the ~~at least one~~ first drive mechanism;

a second fluid container operably associated with the second drive mechanism; and

a control device operably associated with the ~~at least one~~ first and second drive mechanisms, said control device comprising:

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means for programming a first phase of an injection procedure as a contrast medium phase or a flushing medium phase;

~~means for programming a first phase of an injection procedure as a flushing medium phase;~~

means for programming a second phase of an injection procedure as a contrast medium phase or a flushing medium phase;

~~means for programming a second phase of an injection procedure as a flushing medium phase; and~~

means for programming a pause phase to occur between the first and second phases of an injection procedure.

45 (Currently Amended). A fluid injection apparatus comprising:

~~at least one~~ a first drive mechanism and a second drive mechanism;

~~at least two~~ a first fluid containers container operably associated with the ~~at least one~~ first drive mechanism, ~~one~~ the first fluid container containing a contrast first medium ~~and the other fluid container containing a flushing medium; and;~~

a second fluid container operably associated with the second drive mechanism, the second fluid container containing a second medium; and

a control device operably associated with the ~~at least one~~ first and second drive mechanisms, said control device comprising means for establishing a first phase of an injection procedure as a phase other than a contrast medium phase.

46 (Currently Amended). A fluid injection apparatus comprising:

~~at least one~~ a first drive mechanism and a second drive mechanism;

~~at least two~~ a first fluid containers container operably associated with the ~~at least one~~ first drive mechanism, ~~one~~ the first fluid container containing a contrast first medium ~~and the other fluid container containing a flushing medium; and;~~

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a second fluid container operably associated with the second drive mechanism, the second fluid container containing a second medium; and

a control device operably associated with the ~~at least one~~ first and second drive mechanisms, said control device comprising an arrangement for programming a first phase of an injection procedure as a phase other than a contrast medium phase.

47 (Currently Amended). A fluid injection apparatus comprising:

~~at least one~~ a first drive mechanism and a second drive mechanism;

~~at least two~~ a first fluid containers container operably associated with the ~~at least one~~ first drive mechanism, ~~one the first~~ fluid container containing a ~~contrast~~ first medium ~~and the other fluid container containing a flushing medium; and;~~

a second fluid container operably associated with the second drive mechanism, the second fluid container containing a second medium; and

a control device operably associated with the ~~at least one~~ first and second drive mechanisms, said control device comprising an arrangement for establishing a first phase of an injection procedure as a phase other than a contrast medium phase.

48 (Currently Amended). A method of programming an injection apparatus comprising a drive mechanism operably associated with, ~~at least two~~ a first and a second fluid container[[s]], and a control device for programming the injection procedure, the method comprising:

selectively programming a plurality of phases of an injection procedure, each of the ~~plurality of phases~~ capable of comprising at least one of a contrast medium phase, a flushing medium phase and a KVO phase.

49 (Currently Amended). A method of programming an injection apparatus comprising a drive mechanism operably associated with, ~~at least two~~ a first and a second fluid container[[s]], and a control device for programming the injection procedure, the method comprising:

selectively programming at least two phases of an injection procedure, the first phase comprising one of at least a contrast medium phase and a flushing medium phase and the second phase comprising a hold phase, wherein KVO occurs during the hold phase.

50 (Currently Amended). A method of programming an injection procedure, comprising:

providing an injection apparatus comprising a drive mechanism operably associated with, ~~at least two~~ a first and a second fluid container[[s]], and a control device for programming the injection procedure;

selectively programming a first phase of the injection procedure, the first phase comprising one of a contrast medium phase and a flushing medium phase;

selectively programming at least a subsequent second phase of the injection procedure, the second phase comprising one of a contrast medium phase and a flushing medium phase; and

selectively programming a KVO phase.

51 (Original). A method of programming an injection procedure comprising:

programming a first phase of an injection procedure;

programming a second phase of an injection procedure to occur subsequent to the first phase; and

programming a third phase of an injection procedure, to occur subsequent to the second phase, as a phase other than a flushing medium phase.

52 (Currently Amended). The method of claim 51, wherein said step of programming a first phase of an injection procedure comprises ~~selectably~~ selectively programming the first phase of an injection procedure as a phase other than a contrast medium phase.

53 (Currently Amended). The method of claim 52, wherein said step of programming a first phase comprises ~~selectably~~ selectively programming the first phase as a contrast medium phase.

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54 (Currently Amended). The method of claim 51, wherein said step of programming a second phase comprises ~~selectably~~ selectively programming the second phase as a contrast medium phase.

55 (Currently Amended). The method of claim 51, wherein said step of programming a second phase comprises ~~selectably~~ selectively programming the second phase as a flushing medium phase.

56 (Currently Amended). The method of claim 51, wherein:

said step of programming a third phase is performed during one protocol; and

said method further comprises, during another protocol, the step of ~~selectably~~ selectively programming a third phase of an injection procedure as a flushing medium phase.

57 (Currently Amended). The method of claim 51, wherein said step of programming a second phase of an injection procedure comprises ~~selectably~~ selectively programming the second phase as a hold phase.

58 (Original). The method of claim 51, further comprising the step of programming a pause phase to occur between first and second phases of an injection procedure.

59 (Original). A method of programming an injection procedure comprising:

programming a first phase of an injection procedure;

programming a second phase of an injection procedure to occur subsequent to the first phase;

programming a third phase of an injection procedure to occur subsequent to the second phase; and

programming a fourth phase of an injection procedure, to occur subsequent to the third phase, as a phase other than a flushing medium phase.

60 (Currently Amended). The method of claim 59, wherein said step of programming a first phase of an injection procedure comprises ~~selectably~~ selectively programming the first phase of an injection procedure as a phase other than a contrast medium phase.

61 (Current Amended). The method of claim 59, wherein said step of programming a first phase comprises ~~selectably~~ selectively programming the first phase as a contrast medium phase.

62 (Currently Amended). The method of claim 59, wherein said step of programming a second phase comprises ~~selectably~~ selectively programming the second phase as a contrast medium phase.

63 (Currently Amended). The method of claim 59, wherein said step of programming a second phase comprises ~~selectably~~ selectively programming the second phase as a flushing medium phase.

64 (Currently Amended). The method of claim 59, wherein said step of programming a third phase comprises ~~selectably~~ selectively programming the third phase as a contrast medium phase.

65 (Currently Amended). The method of claim 59, wherein said step of programming a third phase comprises ~~selectably~~ selectively programming the third phase as a flushing medium phase.

66 (Currently Amended). The method of claim 59, wherein:

said step of programming a fourth phase is performed during one protocol; and

said method further comprises, during another protocol, the step of ~~selectably~~ selectively programming a fourth phase of an injection procedure as a flushing medium phase.

67 (Currently Amended). The method of claim 59, wherein said step of programming a second phase of an injection procedure comprises ~~selectably~~ selectively programming the second phase as a hold phase.

68 (Original). The method of claim 59, further comprising the step of programming a pause phase to occur between first and second phases of an injection procedure.

69 (Original). A method of programming an injection procedure comprising: programming a first phase of an injection procedure as a phase other than a contrast medium phase.

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70 (Currently Amended). The method of claim 69, wherein:

said step of programming a first phase is performed during one protocol; and

said method further comprises, during another protocol, the step of ~~selectably~~ selectively programming a first phase of an injection procedure as a contrast medium phase.

71 (Original). The method of claim 69, further comprising the step of programming a KVO phase.

72 (Original). The method of claim 69, further comprising the step of programming a second phase of an injection procedure, to occur subsequent to a first phase of an injection procedure, as a hold phase.

73 (Original). The method of claim 69, further comprising the step of modifying, during said hold phase, one or more injection parameters of a subsequent phase.

74 (Original). The method of claim 69, further comprising:

programming a second phase of an injection procedure to occur subsequent to the first phase of an injection procedure; and

programming a pause phase to occur between first and second phases of an injection procedure.

75 (Currently Amended). The method of claim 74, wherein said step of programming a first phase comprises ~~selectably~~ selectively programming the first phase as a flushing medium phase.

76 (Currently Amended). The method of claim 74, wherein said step of programming a second phase comprises ~~selectably~~ selectively programming the second phase as a contrast medium phase.

77 (Currently Amended). The method of claim 74, wherein said step of programming a second phase comprises ~~selectably~~ selectively programming the second phase as a flushing medium phase.

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78 (Original). The method of claim 74 wherein said step of programming a pause phase comprises establishing said pause phase for a fixed duration of time.

79 (Currently Amended). A method of programming an injection procedure, comprising:

~~selectably~~ selectively programming a first phase of an injection procedure, during a first protocol, as a contrast medium phase;

~~selectably~~ selectively programming a first phase of an injection procedure, during a second protocol, as a flushing medium phase; and

programming a second phase of an injection procedure, subsequent to the first phase during at least one of said first and second protocols, as a hold phase.

80 (Currently Amended). A method of programming an injection procedure, comprising:

~~selectably~~ selectively programming a first phase of an injection procedure, during a first protocol, as a contrast medium phase;

~~selectably~~ selectively programming a first phase of an injection procedure, during a ~~first~~ second protocol, as a flushing medium phase;

~~selectably~~ selectively programming a second phase of an injection procedure, during one of said first and second protocols, as a contrast medium phase or a flushing medium phase;

~~selectably programming a second phase of an injection procedure, during one of said first and second protocols, as a flushing medium phase; and~~

programming a pause phase to occur between first and second phases of an injection procedure, during at least one of said first and second protocols.

81 (New). The method of claim 69, wherein said step of programming a first phase comprises selectively programming the first phase as a KVO phase.

82 (New). A fluid injection apparatus comprising:

a first and a second drive mechanism;

a first fluid container operably associated with the first drive mechanism;

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a second fluid container operably associated with the second drive mechanism; and

a control device operably associated with the first and second drive mechanisms, the control device operable to selectively program a KVO phase by defining at least two injection parameters selected from fluid flow rate, fluid volume and injection duration.

83 (New). A fluid injection apparatus comprising:

an injector comprising a first drive mechanism and a second drive mechanism;

a first fluid container operably associated with the first drive mechanism, the first fluid container containing a first medium;

a second fluid container operably associated with the second drive mechanism, the second fluid container containing a second medium; and

a control device operably associated with the first and second drive mechanisms;

wherein said control device is adapted to allow an operator to selectively program a plurality of phases of an injection procedure, the plurality of phases comprising:

a first phase comprising a contrast medium phase or a flushing medium phase; and

a second phase comprising a hold phase operable to allow the operator to modify one or more injection parameters of a further subsequent phase.

84 (New). The fluid injection apparatus of Claim 83 further comprising a third phase, subsequent to the hold phase, comprising a contrast medium phase or a flushing medium phase.